11. Notes on East African Lizards collected 1915–1919, with Description of a new Genus and Species of Skink and new Subspecies of Gecko. By Arthur Loveridge.

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(Text-figure 1.)

The following notes are based on a collection of 900 lizards and chameleons collected by the writer during the campaign in East Africa. Over a thousand specimens were collected, but one box containing lizards from Kerogwe, Handeni, etc., and handed to the S. & T. for transmission to the base, never reached its destination. Another box containing half-a-dozen jars of lizards and chamæleons was lost *en route* for England. Besides these there are a good many specimens in the Nairobi Museum collected by the writer which were not brought home, and therefore were not available for study for the present paper.

Representatives of all the families of East African lizards were taken, more than half the genera and about one-third of the recorded species. The numbers are distributed as follows:—

Family.	Genera.	Species.	Number of specimens.
Geckonidæ	5	12	255
Agamidæ	1	5	55
Zonuridæ	1	1	12
Varanidæ	1	2	13
Amphisbænidæ	1	1	7
Lacertidæ	5	6	69
Gerrhosauridæ	1	2	46
Scincidæ	5	12	330
Anelytropidæ	1	1	1
Chamæleontidæ	2	9	112
		Total ...	900

The most representative collection was made in Ex-German East Africa, where the writer spent two and a half years. Six months were spent in Portuguese East and one and a half years in British East Africa. The field-notes are not so extensive as would have been the case had conditions not been so adverse. For nearly twelve months all specimens had to be carried on the saddle until camp was made, and an opportunity arose to send them back to the base on the returning supply lorries.

The principal localities mentioned in the following pages are:—

British East Africa: West Mt. Kenia, Mt. Siswa, Mt. Margaret, Kedong Valley, Thika, Nairobi, Kabete, Kagiado, Bissel, Voi, Mbunyi, Mombasa.

Ex-German East Africa: West Mt. Longido, Aruscha, Moschi, Kahe, Palms, Tsame, Gonya, Mkomasi, Mombo, Kerogwe, Handeni, Lukigura, Makindu (Msiha River), Ngeri-Ngeri, Mikesse, Mkuyuni, Matombo, Duthumi, Tabora, Dodomo, Kongwa, Morogoro, Dar-es-Salaam.

Zanzibar.

Portuguese East Africa: Lumbo (on mainland 3 miles from Mozambique), Delagoa Bay.

The identification was carried out at the British Museum at South Kensington, where I had the advantage of examining the types of a great many of the species referred to in the following pages, as well as large series for comparison from many localities. The notes were afterwards worked up at home.

I should like to take this opportunity of thanking Mr. G. A. Boulenger for the great kindness which he showed me. Not merely by according me free access to his papers and the collections in his care, but at all times so readily giving advice, examining specimens, or making lengthy translations from the German text. Without his kindly oversight I should never have completed these notes, or, if completed, should without doubt have made many blunders.

It is with the object of showing my appreciation for the help so freely given that I have associated Mr. Boulenger's name with the only new lizard found in the collection, an interesting limbless burrowing Skink described in the following pages.

Only one local race has been given a subspecific name, though on colour grounds the Mombasa (Frere Town) form of *Lygodactylus picturatus*, the Dodoma specimens of *Agama lionotus*, and the Longido specimens of *Mabuia brevicollis* might be considered by some as meriting formal names.

Measurements are given to the nearest eighth of an inch, followed by the exact measurements in millimetres of the length of head and body followed by the tail length when intact.

I am indebted to Mr. H. A. Baylis for identifying the parasitic worms found in many species of lizards. Some of these are possibly new, and as the descriptions have not yet been published, only the generic names are given in the following pages.

Geckonidæ.

Hemidactylus citernii (Blgr.).

Blgr. Ann. Mus. Gen. (3) v. 1912, p. 329.

A single male was collected at Nairobi on 3. iv. 15. It was found beneath a stone on the hillside. Total length $2\frac{7}{8}$ inches (38·35 mm.).

The type locality of this recently described species is in Somaliland. The type is in the British Museum, and the above specimen was identified for me by Mr. Boulenger. This new record shows the species to be widely spread.

Hemidactylus mabouia (Gray).

Blgr. Cat. Liz. i. 1885, p. 122.

This is undoubtedly the commonest of the East African Geckos. Seventy-one specimens were collected. In British East at Voi; in German East at Tsame, Mkomasi, Kerogwe, Lukigura, Makindu, Amani, Kongwa, Morogoro, Dar-es-Salaam, and Duthumi; in Portuguese East at Lumbo and Delagoa Bay. It is commonly found in houses and out-buildings, but is almost as common on trees.

The coloration is very variable. Those taken in the burnt-out interior of trees were practically black, others hiding in crevices of Paupau-trees were a pale straw-colour; some of the very largest were found on trees at Lukigura and Makindu, where their darkly barred and mottled skins by accentuating the small tubercles led me to suppose them to be a distinct species. Those found in houses, particularly where the walls were whitewashed, were pale flesh-colour or almost transparent. The change of colour may also be influenced by their feelings apparently, for on one occasion I witnessed two of them fighting—the victor was pale grey and the pursued brown-black.

The largest specimens were taken at Morogoro. Both male and female measured $7\frac{3}{8}$ inches (86·102 mm.). It was curious that both these large specimens should be in the same proportions of head and body to tail, for the tail of the male was a reproduced one, while that of the female was intact.

An extraordinary percentage of the Morogoro specimens had regenerated tails, no fewer than twenty out of the thirty-one collected. It occurred more frequently in males than in females, and I attributed this to the combats that take place, which are presumably amongst the males. In an outhouse I saw a specimen with bifid tail, but did not succeed in catching it. At Kerogwe I caught seventeen specimens without one dropping its tail; eleven of these had their original tails, five males and one female had secondary growths. I put one of these Geckos into a vivarium with an Underlined Sand-Snake (*P. subtæniatus*): the rapidity with which the snake gave chase was almost incredible; the weather being hot, the snake darted and doubled about the case. The Gecko dropped its tail, but the snake, undeceived by the wriggling of the severed tail, shortly after seized the Gecko, and when the latter became limp from the poison—swallowed it.

The eggs of this species are almost globular except for a flattening at the point of attachment; they are soft and sticky when laid, and thus adhere to the bark, in whose crevices or beneath which they are deposited. Two are produced at a time; in diameter they are from 10 to 12 mm.; the shell soon hardens and becomes very brittle, so that it is difficult to detach them from the bark without breaking them; the surface of the shells is finely granulate and the colour is opaque or bluish-white. Eggs were taken on July 29th at Makindu, on March 9th and

December 20th at Morogoro, on October 16th at Lumbo. The last-mentioned hatched out the same day; the emerged young one measured just under $2\frac{1}{2}$ inches (31·31 mm.), which is extraordinary when one considers the size of the egg. Two eggs collected upon some books at Mombasa on November 17th, 1919, also hatched out within a few days, so that the species probably breeds at any time of the year.

Flies and spiders are their usual food, but I have also taken small beetles, and one particularly gorged specimen had a big brown cockroach 40 mm. long in its stomach.

This species is particularly liable to small red acarine parasites, which generally are found scattered about the ventral surface.

Hemidactylus squamulatus (Torn.).

Tornier, Thierw. Ost-Afr. Rept. 1896, p. 10.

Two males only, collected at Morogoro, the first under an ox-hide on 8. v. 17 measured just under $2\frac{3}{8}$ inches (33·26 mm.), but the tail was reproduced, the second on 9. iv. 18 was $3\frac{1}{4}$ inches (42·42 mm.).

Compared with specimens in the British Museum from Voi, Tsavo, Samburu, and Kitui.

Hemidactylus brookii (Gray).

Blgr. Cat. Liz. i. 1885, p. 128.

Thirty specimens were collected at Morogoro, Duthumi, and Lumbo; at the former place they were mostly to be found in grass-huts and among rubbish heaps, but at the other localities they were all found on trees.

The largest male measured $3\frac{1}{4}$ inches (40·40 mm.) and was from Lumbo; the largest female measured $3\frac{1}{2}$ inches (54·33 mm.), though the tail was reproduced: it was taken at Morogoro. Female with eggs taken 14. ii. 17.

The types of this species from Borneo and Australia in the British Museum were examined, as well as the fine series from African localities. *H. brookii* has a wonderfully wide distribution in East Africa from Somaliland to Portuguese East; it also occurs on the West Coast.

Hemidactylus ruspolii (Blgr.).

Blgr. Ann. Mus. Gen. (2) xvii. 1896, p. 6.

Seventeen specimens, of which three were from Mbunyi, B.E.A.; one from Longido West; twelve from Morogoro; and one from Duthumi, G.E.A. The Mbunyi and Longido specimens were taken from fissures and crevices of thorn-trees, the Morogoro ones beneath stones and dug out of an earth-bank, where they lived in holes.

Six of these were males, of which the largest measured 5 inches (67·60 mm. regenerated), from Mbunyi. By far the largest of

the eleven females was from Duthumi; this specimen measured $6\frac{1}{4}$ inches (77·82 mm.). In both of these the tail was reproduced and carrot-shaped; the female was strikingly so, measuring 17 mm. across at the base and tapering to a point; the body only measured 23 mm. across. In life these Geckos have an orange-colour, much brighter on the tail; this was so as regards the Morogoro specimens, but I did not notice it at Mbunyi.

The following is a note from my diary of the colour of a living Morogoro specimen:—"The head and back are of a very dull orange-colour; a black stripe passes through the eye; three pairs of rather indefinite ocelli on the sides are connected by black saddle-like markings bordered with whitish granules; the tail is brilliant orange ringed with black, the rings becoming less distinct on the lower surface; throat, belly, and under-surface of legs transparent white."

LYGODACTYLUS CAPENSIS MOSSAMBICA, subsp. nov.

Blgr. Cat. Liz. 1885, p. 160.

Fifty specimens of a Gecko were collected at Lumbo, P.E.A., which agreed with the description of *L. capensis* (Smith) in all particulars, with the exception of the scaling on the underside of the tail. In *L. capensis* the underside of the tail is covered with large imbricate scales except in regenerated tails, where occasionally one finds broad transverse scales in a median series. In all the specimens collected at Lumbo this transversely dilated median series was a constant feature both in the original and renewed tails.

There is an exceptionally fine series of *L. capensis* in the British Museum, and specimens were examined from the following localities:—South Africa; Transvaal (Zoutpansburg, Rustenburg, De Kaap Goldfields); Natal (Lower Unkomaas River); Rhodesia (Mazoe); Zululand (Indukuduku, Ngoye Hills); Portuguese Gazaland (Jiku, Kurumadzi River); Portuguese East Africa (Delagoa Bay, Shire Highlands); Mashonaland (Mt. Chirinda); Tanganyika: French Congo (Benito River): Nyassaland (Fort Johnson, Zomba); Angola (Chiyaka District); Benguella (Interior); South Somaliland (Lush). All these agree with the original description.

Specimens from Beira and Cogano, P.E.A., however, were intermediate between the typical *L. capensis* and the Lumbo race, one or two of the Beira specimens being practically indistinguishable from those collected at Lumbo. In view of the large series of specimens collected and the constancy of the character, I propose to designate this local race as a subspecies under the name of *mossambica*.

The largest male measured $2\frac{5}{8}$ inches (35·31 mm.), and the largest female just over $2\frac{1}{8}$ inches (33·22 mm. regenerated). These specimens I regard as the types. The average length of nineteen males was 61 mm. (30·31 mm.), and of thirty-one

females 57 mm. (29·28 mm.); a few specimens with regenerated tails are included in these averages.

Coloration from notes made from the living Gecko, as follows:—"Grey or olive-brown above, darker or lighter according to habitat. Black lateral lines spotted with cream commence at nostrils and disappear at, or on hind legs. A pair of dorso-lateral lines bordered on their inner edge by fawn-coloured lines commence on frontal region and vanish on tail. In some specimens these lines were broken into a series of dots, in others they were very indistinct. Whole dorsal surface much mottled with darker and lighter spots. Throat pure white, bespeckled in males; rest of under surface yellowish-white. Regenerated tails plumbeous."

Eggs two in number, pure white, more bird-shaped than most Gecko eggs. Measured 7 mm. × 6 mm. Laid in crevices of bark. Eggs collected on 27. vii. 18 hatched on 16. x. 18. Newly emerged young measured 24 mm. (13·11 mm.).

Blue-bottle fly, large beetle larva, and small brown beetles were found in stomach. On one occasion I saw a young Gecko seize a small staphylinid beetle and drop it quickly, shaking its head vigorously as does a person after taking a nauseous draught.

The type specimens and others have been given to the British Museum. Co-types have been donated to the National Museum of Wales, Manchester Museum, American Museum of Natural History, Smithsonian Institute, Prof. Barbour at Harvard University, and Nairobi Museum, British East Africa.

Lygodactylus fischeri scheffleri (Sternf.).

Sternfeld, Ergebn. Deutsch. Zentr. Afr. Exp. 1918, iv. 2, p. 206.

Two males taken on thorn-trees at Mbunyi (15. v. 16). The larger measures $2\frac{1}{4}$ inches (26·30 mm.).

Lygodactylus grotei (Sternf.).

Sternfeld, S.B. Ges. Naturf. Berlin, 1911, iv. p. 245.

Twenty-one specimens in all were collected—nine males, nine females, and three immature young. Localities—Morogoro, Msiha, Duthumi. The favourite haunts of this species were the banana-palms and paupau-trees, on whose stems they disported themselves in the sunshine; occasionally they were found on shrubs, stumps, or low bushes.

The largest male measured $2\frac{3}{4}$ inches (32·38 mm.), the largest female $2\frac{3}{4}$ inches (33·37 mm.). On February 24th, 1917, a pair were seen *in coitu* on a spray of mimosa thorn. It was about 8 A.M., and the sun was causing the heavy dew-drops to glisten.

Lygodactylus picturatus (Peters).

Blgr. Cat. Liz. i. 1885, p. 161.

Forty specimens available for present paper; large series from

Kerogwe and Handeni were lost in transit. Seen at Mombasa Island, Zanzibar, Mombo, Palms, Ngeri Ngeri. Collected at Kerogwe, Handeni, Morogoro, and Dar-es-Salaam.

A purely arboreal Gecko living on tree-trunks; the following notes were made at various localities:—

Zanzibar (30. xii. 14). Was disappointed in not securing a Gecko, whose body was bark-colour but whose head was like a patch of yellow lichen.

Handeni (26. vi. 16). Caught sight of a small grey Gecko with a yellow head similar to those seen at Palms a few days ago. They frequent large trees and come down within a couple of feet of the ground; should anyone approach, they glide round to the opposite side of the trunk and then hasten towards the top. On two trees the yellow heads of these Geckos rendered them conspicuous, but on a third, which was overgrown with tufts of grey and yellow lichen, the yellow head broke up their outline and rendered them inconspicuous; this seems to be the probable explanation of their somewhat peculiar coloration. By far the most interesting thing about them was the tip of the tail, upon which were transverse lamellæ similar to those on digits of most Geckos. This arrangement serves them as a fifth foot, thus providing additional grip.

Handeni (27. vi. 16). Hunted most of the likely trees for Geckos similar to the specimen taken yesterday; most of them were too quick for me, save those on one stump not more than ten feet high. In passing this, I fancied seeing something glide round, so dodged to and fro until I caught sight of a retreating tail. Having broken off all the smaller twigs, I put my arms around the stump near the ground, then ran them up to a height of five feet, where I tied a white handkerchief loosely around to keep them from coming down. Then swarming up, I broke off all the remaining branches, raised the kerchief within a foot of the top, and then captured one by one the male and two female Geckos which were there. The male was very handsomely coloured, with a velvety-black throat merging into a bright yellow stripe along the centre of the belly. The grey and yellow of the back and head (upper surface) were also much more vivid than in the specimen taken yesterday. The females possess the power of changing colour with great rapidity, being quite brown when first sighted, but changing to a dull imitation of the male when pursued.

Kerogwe (5. vii. 16). The Yellow-headed Geckos are very abundant here, almost every third tree is inhabited by them. Several pairs of their hard-shelled eggs were found under the bark of the trees.

Morogoro (2. iii. 17). Yellow-headed Geckos very abundant here on the trunks of the Acacia-trees, which border many of the roads; these Geckos are always to be found on the sunny side of the tree-trunks during the mornings. The male is handsome blue-grey with a brilliant yellow head, which fades in spirit, so

that only some longitudinal dark striations or mottlings are to be seen in the preserved specimen. The chin and throat in adult males only are velvety black, extending back as far as the fore legs; immature specimens have unmarked throats or like those of females. The rest of the under-surface as far back as the vent is orange, whilst small yellow patches mark the underside of the legs. The tail is grey beneath. The throat of the female is white mottled with a network of black lines; the upper surface of the head in adults is pale yellow, barred or mottled with yellow; the back is brown or greyish, with indistinct darker markings. When struck sharply on the back with a cane so as to be instantly killed, this Gecko frequently falls over backwards, and remains attached to the tree by the sucker-apparatus of the tail tip.

Lang, in his field-notes on *Lygodactylus picturatus gutteralis* *, speaking of this tail, writes: "but the really unique feature distinguishing it from all other Geckos is the adhesive pad on the tip of the tail"; this is evidently a slip, as this is a generic character †.

The largest males taken measured $3\frac{3}{8}$ inches (43·43 mm.) and largest female $3\frac{1}{8}$ inches (38·41 mm.). It is very unusual for this species to drop its tail, and most of the specimens taken had intact tails.

At Morogoro (1.i.17) a pair were seen courting. "After recent heavy rains the sun came out bright and fresh this morning, and almost every tree in the avenue had a pair of Yellow-headed Geckos in brilliant colour on its sunny side. A pair were courting, the female chasing off the male every time he approached. He arched his neck in an unusual manner and exposed his throat, presumably to exhibit the velvety-black patch peculiar to the male."

Eggs were found at Morogoro on 1.ii.18, at Dar-es-Salaam on 11.iv.18 (in one group of three it is just possible that two Geckos had laid together; two eggs being the usual number), and at Kerogwe on 5.vii.16.

In the 'Catalogue of Lizards' the colour of *L. picturatus* is given as "head and anterior part of body bright yellow, with dark brown or black lines and spots....." At Frere Town, which is situated on the mainland opposite Mombasa Island, from which it is only separated by a channel not more than 500 yards across, is a very distinct form which has no yellow head, nor yellow on any part of the body. When first seen I thought it was a distinct species, but after a careful examination I can detect no structural difference between it and *picturatus*, which I have seen on Mombasa Is. though never collected. In the British Museum is a specimen of the Frere Town form, labelled "Mombasa," and collected by A. Blayney Percival, Esq.,

* Schmidt, Bull. Amer. Mus. of Nat. Hist. xxxix. 1919, p. 465.

† Mr. Schmidt points out to me that the lamellæ on the tail are not even a generic distinction, as they are also found in *Diplodactylus palmatus* Mocq.

which conceivably may have been taken on the adjoining mainland. In the Nairobi Museum are two specimens collected at Jilore, Giriama, and presented by Mr. T. B. Nair, which are also the Frere Town form. Unfortunately the colouring of the head does not remain in preserved specimens.

The coloration of the Frere Town form in life is as follows:— Male: *Head white*, *transverse* black band across supra-ocular region, a second in parietal region; three longitudinal black lines unite these two to form a gridiron pattern; a third cross-band on nape. A double row of large black spots, sometimes united to form transverse bands, on back from nape to base of tail; there may be as many as eleven pairs of spots. A black stripe commencing at nostril passes through eye and over fore-limb, where it ends above axilla. Very narrow black line borders tips of upper and lower labials, continues below ear-opening and on to the fore-limb, where it disappears before reaching elbow. Nine to twelve vertical black stripes of irregular shape along each side. Throat black, *not* extending beyond an imaginary line drawn from ear to ear, except for two narrow line-like continuations, only a couple of scales in width, which extend back to fore-limbs. Belly white, projecting forward into black throat like the arms of the letter "U."

Female as in male, except for white throat, which has an inner and outer *chevron-shaped* black marking.

Fourteen specimens were collected, of which the largest male measured $2\frac{7}{8}$ inches (36·36 mm.) and female 3 inches (36·38 mm.).

Platypholis fasciata (Blgr.).

Blgr. P. Z. S. 1890, p. 80.

Two males and a female taken on thorn-trees at Mbunyi. Largest male 4 inches (64·37 mm.), and female 5 inches (80·45 mm.). Both specimens had reproduced tails. Two ovules $\frac{3}{8}$ inch diameter in females.

The type specimen on which the genus was founded as well as the species was collected at Mombasa; another specimen in the British Museum which was examined came from Maziwi, which the label states is between Mombasa and Kagiado, therefore not very far distant from Mbunyi. Yet another specimen has been recorded by Boulenger from Upper Ganali, Juba River.

Phelsuma laticauda (Boettg.).

Blgr. Cat. Liz. i. 1885, p. 215.

Two males taken at Dar-es-Salaam (10. xi. 18) measure $4\frac{3}{8}$ inches (59·53 mm.) and $4\frac{5}{8}$ inches (59·60 mm.). I should not have got these specimens, which dwell in the tops of the lofty palms, had I not been passing as some natives were cutting branches for thatching; three specimens were seen but only two captured. These differ from one another in several respects: the first has a median cleft on rostral, absent in the second; it

has 9 upper and 8 lower labials. It has three scales between naso-rostrals, and the dorsal scales are distinctly keeled; in both of which points it differs from the other specimen, which has two scales between the naso-rostrals, and the scales unkeeled on the dorsal surface of tail.

Colour-notes in life are: "Dark green colour, finely freckled with red on back and base of tail."

It has been previously reported from Nossi Be, Johanna, Farquhar Is., Zanzibar, Comoro Is., Madagascar, but not from the mainland of East Africa.

Elasmodactylus triedrus (Blgr.).

Blgr. Rev. Zool. Afr. iii. 1913, p. 104, pl. v. fig. 2.

Two specimens of this rare Gecko were taken—a male from Kongwa (21. iv. 17), measures $5\frac{3}{8}$ inches (70·67 mm.); and a female whose locality is somewhat uncertain, though I believe it was taken in the neighbourhood of Morogoro, measures $4\frac{1}{2}$ inches (57·57 mm.).

Agamidæ.

Agama colonorum (Gray).

Blgr. Cat. Liz. i. 1885, p. 356.

Thirty-four specimens were obtained at Thika, Gonya, Kongwa, Morogoro, Mkuyuni, Duthumi, and Lumbo. The largest Morogoro male measured $9\frac{1}{8}$ inches (121·111 mm., tip of tail missing). largest Morogoro female 11 inches (105·175 mm.), seventeen specimens were collected at Morogoro. Of fourteen specimens collected at Lumbo the largest male measured 13 inches (116 213 mm.), and female 12 inches (104·204 mm.).

Coloration was very variable; the following note was made on a Lumbo male:—"Dirty cream or pale grey, with dark brown vermiculations. Dorsal crest pale blue, particularly bright on neck. Head dark brown above, vermiculated with same on sides; indistinct red stripe from eye to eye: irregular line of a fine brick-red colour originates behind ear and is lost in a large patch of same colour just above fore-leg. Chin vermiculated with rich blue, converging to a blue patch on throat. Belly and under-surface of tail dirty white."

A female was killed at Morogoro on 14 ii. 17 with 12 eggs in ovary measuring 15 × 10 mm. Another was killed on 1. iv. 18 with 10 eggs 18 × 10 mm.

Ants of several species, including the fierce little cock-tail species, beetles, large cricket, and millipedes were found in stomachs.

Physaloptera was taken in the stomach of this species.

This species is very arboreal; if found upon the ground it is usually not far from a tree, to which it flies for refuge.

A very large specimen was found partly digested in the stomach of a Hissing Sand-Snake (*Psammophis sibilans*) at Lumbo (x. 1918).

Many specimens are infested with a small acarid (*Pterygosoma agamæ*) beneath the ventral scales. A new nematode (*Oochoristica agamæ*)* was found in several.

AGAMA FLAVICAUDA (Werner).

Wern. Zool. Anz. xx. 1897, p. 264.

Agama caudospina Meek, Field Mus. Nat. Hist. vii. 1910, No. 11, p. 407.

Several specimens in the Nairobi Museum were collected by the writer at West Kenia (23. xi. 15). A large male measures $8\frac{3}{4}$ inches (100·120 mm.). These specimens were taken in the thatch of a pig-sty, and in an isolated pinnacle of earth where they had taken up their abode in the holes excavated by Sand-Martins, as well as in natural crevices. There are also specimens in the Museum collected by Mr. Allen Turner at Kegamaia, near Mt. Elgon.

There can be no doubt that *Agama caudospina* recently described by Meek from Elementeita, B.E.A., should be relegated to the synonymy of this species. Werner's description was based on a single male of unknown locality. Both names are very descriptive of this species, which is quite unlike any other Agama collected.

AGAMA LIONOTUS (Blgr.).

Blgr. P. Z. S. 1896, p. 214, pl. viii.

Thirteen specimens from Voi, Mbunyi, Longido West, and Dodoma. Was also seen at Kahe and Kongwa; there are specimens in Nairobi Museum collected by the writer near the Kedong Valley.

The type specimen from S.E. of Lake Rudolph, as well as specimens from Mt. Kenia and Ngaya (south of Lake Victoria), B.E.A., which are in the British Museum, were examined. Arranging the specimens geographically from the type locality southwards one finds a marked increase in the scale-rows.

Rudolph.	M.	Type.	65	scale-rows round mid-body.
Voi.	M.	17. vi. 16.	73	,, ,, ,,
Mbunyi.	M.	15. v. 16.	75	,, ,, ,,
Longido.	M.†	1. ii. 16.	80	,, ,, ,,
Dodoma.	M.	8. xii. 18.	75	,, ,, ,,
,,	F.	,,	78	,, ,, ,,
,,	M.	,,	80	,, ,, ,,
,,	F.	,,	82	,, ,, ,,
,,	M.	,,	87	,, ,, ,,

I draw attention to this for a purpose. These Dodoma specimens are strikingly different in life to those collected elsewhere. The throat of the males from other localities was invariably

* Baylis, Parasitology, xi. 1919, p. 409.

† 3 males examined.

scarlet in the breeding adults. I was at once struck by the handsome throats of the Dodoma specimens as they bobbed their heads up and down upon the rocks where they basked in the sun. The throat of these males has a pear-shaped scarlet patch 14 scales wide and 30 to 32 scales long; it is surrounded by a rich navy-blue border 9 scales in width; outside the posterior part of this is a semicircle of scarlet commencing narrowly at base of jaws and widening on the throat. These males are far larger than the type or any collected elsewhere. Both the largest males measured $11\frac{1}{2}$ inches (140·150 mm., tails missing), the largest female measured $11\frac{1}{4}$ inches (112·173 mm.).

There appear to be no scale characters whereby the Dodoma specimens can be distinguished; they have a far larger number of scale-rows round mid-body than the type, but as the cross-country series show an intergradation in this character, it appears to be a pity to multiply local races by giving them names.

A couple of notes made on Longido specimens are interesting, as they show something of the chamæleon-like possibilities of this Agama :—28. i. 16. "Was successful in shooting one of the scarlet-headed, blue-bodied Agamas. As soon as it was put in formalin all the bright colouring departed, and it became a study in browns." 2. ii. 16. "A brown Agama was basking on a rock, and I killed it very suddenly with a smart blow across the back, causing it to fall over with a little quiver, its back evidently broken. I placed it in a black bag, and on my return to camp was surprised to find its head of a brilliant scarlet and the body bright blue, exactly the reverse of what occurred with a shot specimen a few days ago. It appears probable that all the Agamas hereabouts are only colour variations of the one species." Of a male shot in the Kedong Valley I wrote, 19. vii. 15: "Shot a brilliantly coloured Agama, head rich brick-red, and the body, more particularly underneath, a vivid ultramarine blue."

All the specimens were found upon rocks and the same type of sandy thorn-bush country.

The two Dodoma females contained eggs, the larger having 8 and the smaller 7, measuring 20 × 12 mm. (8. xii. 18).

Agama vaillanti (Blgr.).

Blgr. Ann. Mus. Civ. ser. 2, vol. xv. 1895, p. 12.

Five specimens in all were obtained, two being from Mbunyi and three from Voi. One of the Mbunyi specimens measured 85 mm. in body, but the tail was mutilated. The largest Voi specimen measured $9\frac{7}{8}$ inches (80·170 mm.). Found on reddish sandy soil, their colouring rendering them inconspicuous.

Agama atricollis (Smith).

Blgr. Cat. Liz. i. 1885, p. 358.

Specimens in the Nairobi Museum were collected in the neighbourhood, where it is very common on trees. Two specimens

collected at Dodoma on thorn-trees appear to belong to this species. They are very small if so, the largest measuring 9 inches (90·140 mm.). Both are males with vermiculations on the throat, which has a blue patch on the basal portion.

A female taken at Nairobi (3. iv. 15) had 10 eggs in ovary, 20 × 10 mm.

Zonuridæ.

Zonurus tropidosternum (Cope).

Blgr. Cat. Liz. ii. 1885, p. 252.

A single specimen was taken at Makindu (Msiha River) and eleven at Morogoro. The largest male (Morogoro) measured $7\frac{1}{8}$ inches (90·90 mm., tip of tail missing), the largest female (Makindu) measured $6\frac{3}{4}$ inches (95·75 mm.).

These specimens entirely bear out the remarks made by Nieden* after an examination of nineteen specimens from many localities in G.E.A. All the specimens agree with *Z. tropidosternum* in the roughness of the head-scales, and the granular interstices between the flank-scales. All except two agree with *tropidosternum* in that the fronto-nasal scale is in contact with the rostral. In these two the nasals separate the fronto-nasal from the rostral, which is the key character for *Z. cordylus*. No reliance can be placed on the arrangement of the head-scales in this genus as a guide to specific character under these circumstances. It is rather interesting to note that one of these specimens in which fronto-nasal and rostral are not in contact was taken on the same day with a normal male and female, and not only so, but within a few yards of them, two of the three were seen to emerge from a hole at the base of a wall; the third was killed at the same wall only a short distance from the hole.

Two specimens were found in a half-drowned condition in roadside gutters, having evidently been washed out of some retreat by the heavy rains. The favourite haunt appeared to be hollow trees, into whose interiors they would retreat and from which it was difficult to get them. The Makindu female was brought into camp in a hollow log which had been cut for fuel; she had remained while it was chopped down. She had four large eggs in the ovary.

Termites were taken from the stomachs of four of the specimens.

Parasitic worm (*Oocharistica zonuri*) proved to be new †.

Varanidæ.

Varanus xanthematicus albigularis (Daud.).

Blgr. Cat. Liz. ii. 1885, p. 307.

The only specimen of the White-throated Monitor met with

* Nieden, Mitt. Zool. Mus. Berlin, 1913, vii. p. 71.

† Baylis, Parasitology, xi. 1919, p. 406.

was found preserved in a German house at Morogoro. I do not believe it was collected in the neighbourhood. Total length 28 inches (300·410 mm.).

Varanus niloticus (Linn.).

Blgr. Cat. Liz. ii. 1885, p. 317.

Met with at Gonya, Msiha, Morogoro, Dar-es-Salaam, Duthumi, and Lumbo. At the last-mentioned place I did not see it myself, but heard of it several times, and the probability is that it was this species and not the white-throated.

The following are the measurements of those obtained :—

M.	Head and body 554 mm.	Tail 850 mm.	Morogoro.	19. i. 18.
F.	„ „ 460	„ 350	„	8. i. 17.
M.	„ „ 407	„ 607	Dar-es-S'm.	15. vi. 18.
M.	„ „ 337	„ 490	Morogoro.	1. iv. 18.
F.	„ „ 370	„ 572	„	1. iv. 18.
M.	„ „ 230	„ 375	„	13. ii. 18.
M.	„ „ 153	„ 235	„	27. iii. 18.
F.	„ „ 142	„ 240	Gonya.	29. v. 16.
M.	„ „ 127	„ 190	Morogoro.	10. iv. 17.
M.	„ „ 120	„ 170	„	1. iv. 18.
?	„ „ 110	„ 170	„	1. xi. 16.
Skin.	„ „ 435	„ 651	Msiha.	14. vii. 16.

In some of the foregoing the tail was missing at the tip.

Along the river-bank at Morogoro they were very common, though more often heard than seen. The first intimation that one was in the vicinity would be a rush through the undergrowth followed by a splash. If you were fortunate you might be in time to see the creature emerge on the opposite bank and crawl into its hole. At other points along the river where the banks were high and cliff-like they might be seen basking on some ledge or drawing themselves up with the aid of their powerful claws.

A good many were captured alive. The usual procedure was for me to wade down the river, with a native walking through the undergrowth along either bank a little in advance. On the Monitor taking to the water, I remained quiet and watching where it emerged and marked down its hole. We could then dig out the hole until the creature was located at the terminus. The hole would then be closed with the shovel till only a small opening remained, large enough for its head to come through, but not to let the body pass if it made a rush. As soon as the head made an appearance, a widely-forked stick would be placed on it by a person standing above and the animal held to the ground. The spade would be pulled away, and a few exciting moments followed as the creature struggled, scratched, and lashed about with its tail. As soon as a favourable moment occurred the tail would be seized with one hand, and with the other (wrapped in a cloth for preference) the Monitor would be securely grasped by the neck and transferred to a sack.

It is a most awkward creature to handle; not only can it give a severe bite, but a lash from the tail of even a small specimen is severe, owing to it turning the dorsal keel over sideways as it strikes. It makes good use of its claws to scratch when seized, and on this account alone I have dropped Monitors which I had securely by the neck.

Hearing that a couple of very large Monitors paid a daily visit to the cook-house, which was situated at the edge of a bank or slide which sloped steeply down to the river nearly 200 ft. below, I walked along the opposite bank of the river one day. A bell was rung at 12 P.M. each day, and from 12.30 to 1.30 P.M. all is quiet. It is then that the reptiles came up for scraps. Whether the ringing of the bell had any significance for them it would be difficult to say. Whilst walking along the opposite bank I descried one of the lizards lying just below the top near the cook-house, but hidden from view from anyone on that bank. After crossing the river I scrambled up thirty foot or so of the slide, and found that the Monitor had disappeared. Even as I looked, however, its head appeared over the top of the bank, and I fired at it with a ·22 Winchester. The bullet caused it to bound over the bank where it lay quiet, for as it heard the bullet whistle past, it imagined the danger came from above.

In its new position it exposed its whole length to me, and I put three bullets into it as fast as I could load; after each it gave a jump, but kept under the bank. Someone, hearing the firing, came to the edge of the bank and looked over, thus disturbing the Monitor, which fled down the bank like a great dog, disappearing into some bushes on the brink of a cliff that rose sheer from the river forty feet below. I feared that it had gone over this, but my boy retrieved it from the very edge. It was not in the least spoilt by the three bullet-holes, and I had to give it a tremendous dose of chloroform to kill it. The creature was a male and measured 55 inches over all. Its stomach contained meat from the cook-house and crabs. Crabs' claws on the partly submerged rocks in the river are generally a sign that Monitors are in the neighbourhood. In the stomach of another specimen I have found the remains of a toad. As is well known, they often come to fowl-houses for the eggs, which seems to be one of their favourite articles of diet.

Ticks are commonly found about the anal region of Monitors.

A worm, *Tanqua tiara* (v. Linst), was found in one specimen at Morogoro (6. iv. 18).

Amphisbænidæ.

Monopeltis colobura (Blgr.).

Blgr. Ann. S. Afr. Mus. v. 1910, p. 495.

Of the ten species of Amphisbænidæ found in East Africa this was the only one met with by the writer. This is its first record

from the East African coast I believe, as it was described from three specimens collected in Barotseland by the Rev. L. Jalla. Type in the British Museum.

A male and half-a-dozen females were taken at Lumbo, P.E.A., between August 20th and October 31st, 1918. The male measured $15\frac{1}{4}$ inches (346·44 mm.) and the largest female $19\frac{1}{4}$ inches (440·50 mm.).

By Europeans and natives alike this strange creature was called a snake. It is decidedly more like a flesh-coloured worm than a lizard. In life the skin is loose and moves freely over the body; it is so transparent that one may see the pulsation of blood in the blood-vessels. The scales, which are almost square in outline, are united in rings around the body. The eye is barely distinguishable as a small black speck. The little white tongue is continually extruded from the mouth after the manner of snakes. The mouth is situated on the lower surface as in burrowing snakes (*Typhlops*), but not so pronouncedly as in sharks. The rostral shield is enormously developed and spade-like. The tail is abruptly truncated, ending in a bone-like knob or shield, doubtless developed for the same purpose as the terminal shield characteristic of the Indian burrowing snakes of the family Uropeltidæ.

Two specimens taken at the end of August contained 4 eggs each; these measured 35×10 mm. and 35×9 mm. respectively. Another specimen laid 4 eggs either during the night or in the early morning of September 20th. No two of these eggs were of the same size: their measurements in millimetres were as follows:—35×8, 32×8, 30×9, 26×9.

No trace of food was found in the stomachs of any of the specimens.

At 2.15 in the afternoon of September 1st I was called to catch a "snake"; the sun was beating fiercely upon the sand at the time. The "snake" proved to be one of these lizards, which had come to the surface and was wriggling about on the scorching sand. On drawing out the last few inches of the creature which still remained in the sand, the cause of its appearance upon the surface at such an uncongenial hour was apparent. Its vent and tail was smothered in ants of a subterranean species, which I have previously noted will eat a dead body from beneath, but appears to hate the light.

At 3 P.M. on September 20th I obtained another specimen under precisely similar conditions, though in this case the lizard was wriggling along the surface of the ground, leaving a trail of ants behind it, while only a few were still clinging tenaciously to its tail.

The following morning yet another was brought to me. It had severe hæmorrhage in the intestinal region, and died during the day. As it was found above ground, I have no doubt that it was also a victim of the voracious ants.

Lacertidæ.

Gastropholis vittata (Fischer).

Blgr. Cat. Liz. iii. 1887, p. 7.

Two specimens of this scarce lizard were obtained; both were females, and neither specimen had the long tail intact. The larger was found bottled without data in a German house at Morogoro. Head and body measured $3\frac{1}{4}$ inches (83·? mm.). The smaller was taken at Lumbo, and measured $2\frac{5}{8}$ inches (67·? mm.) in head and body. Type from Zanzibar in Brit. Mus.

Lacerta vauereselli (Tornier).

Torn. Zool. Anz. 1902, xxiv. p. 701.

Two specimens were obtained. One was shot at Ngong high up on a tree-trunk; as this specimen is in the Nairobi Museum at time of writing I am unable to give its sex or measurements. Ngong Forest edge, 20.ix.15.

The other is a male caught at Parklands Forest edge on 28.ix.15. It measures $6\frac{1}{8}$ inches over all (60·96 mm.) The tail is possibly regenerated. The frontal scale is of equal width along its length, not broader anteriorly. It has nineteen femoral pores on the right leg and eighteen on the left.

Nucras emini (Blgr.).

Blgr. Ann. & Mag. N. H. (7) xix. 1907, p. 488.

Three specimens were caught in B.E.A. and G.E.A. In each case they were running about in sandy paths or places. Their measurements are as follows:—

Male.	Kagiado, 28.xii.15.	6	inches (68·80, regenerated).
Female.	Bissel, 4.i.16.	$6\frac{1}{4}$	,, (60· 98 mm.).
Female.	Longido West, 1.ii.16.	$6\frac{3}{8}$	,, (65. 106 mm.).

Latastia longicaudata (Reuss).

Blgr. Cat. Liz. iii. 1887, p. 55.

Seven specimens in all. A young one at Voi, 17.vi.16.; a half-grown one from Mbunyi, 15.v.16; and five adults, of which four were females, from Dodoma, 8.xii.18. At no other place did I see such fine specimens of this handsome lizard as at Dodoma. All three localities were sandy with scattered thorn-bush, beneath which the lizards quickly took cover; owing to their agility in so doing, only a few specimens were taken, though the creature was abundant at Dodoma.

The largest male measured almost 12 inches (100·202 mm.) and the largest female $12\frac{1}{2}$ inches (95·220 mm.). The male's tail appears to be intact. One of the Dodoma females had ten eggs in the ovary. Remains of beetles were common in their stomachs; one had a grasshopper, whilst another had gorged on a false-spider (Solifugid), and the remains of a false-spider's jaws were

found in yet another lizard. How they manage to eat such an unpleasant mouthful as a false-spider is difficult to comprehend.

Latastia johnstoni (Blgr.).

Blgr. Ann. & Mag. Nat. Hist. (7) xix. 1907, p. 292.

Sixteen specimens taken in shambas and open patches of waste ground at Morogoro. As *Eremias spekii* was found in the same spots, I had a little difficulty in distinguishing the species when they were running about. *L. johnstoni* has a trick, however, of rushing in one direction and then facing about with a little leap, so that it is looking in the direction from whence it came. The tail is also noticeably longer, and has an illusory semi-transparent pinkish effect which disappears after death. It was not nearly so common as *E. spekii* and more difficult to catch.

Colour notes made during life are as follows :—"Ground-colour pale brown. Four parallel cream lines commence at parietals, the outer pair extending forward along outer border of parietals to the eyes, posteriorly they converge to form a single dorsal line on anterior portion of tail. An upper pure white lateral line arising in the sub-ocular passes over ear and is lost on tail. A lower pure white lateral line commences in upper labial region, passes through ear and over fore-limb, is interrupted by hind-limb, but re-commences after and merges into the white on underside of tail. Six or more yellow spots on side between upper and lower lines whose continuity they may break, alternating black bars and red blotches on sides. 4th to 8th upper labials yellow. Throat and underside of body china-white, with a good deal of yellow towards the sides. Limbs mottled and striated."

Largest male 8 inches (64·140 mm.), largest female $7\frac{7}{8}$ inches (60·140 mm).

Ichnotropis capensis (Gray).

Blgr. Cat. Liz. iii. 1887, p. 84.

One specimen taken at Delagoa Bay, 24. xii. 14. They were not uncommon, darting about the reddish sandy soil among the thorn-bush.

Eremias spekii (Günther).

Blgr. Cat. Liz. iii. 1887, p. 84.

Forty specimens were collected at Mt. Siswa (19. vii. 15), Mt. Margaret (21. vii. 15), Voi (17. vi. 15), Duthumi (20. ix. 16), and Morogoro (v. d.).

The coloration of this species was as follows :—" Ground-colour pale brown. Two cream lines starting from parietals converge to form a single dorsal line just behind an imaginary line uniting the fore-limbs where they join the trunk. This line is lost on the tail. Single dorso-lateral line commences at posterior border of eye and merges into the white underside of tail. Single pure white lateral line originating in the sub-ocular and upper labial region

passes through ear and ends at hind-leg ; in some specimens this line is broken up into short white dashes. Black bars and dashes unite this parallel series of lines, and are also seen to a lesser extent on the anterior part of tail. Sides marked with pale green blotches. Upper and lower labials and under surface of body are china-white."

On December 13th, 1917, four eggs were found in a female. A *Gerrhosaurus major* lizard in captivity was seen to seize and eat one of these *Eremias*, and while it was so occupied, a *Gerrhosaurus flavigularis* in the same case came up and tried to take it away. Specimens of this lizard were also found in the stomach of a Harrier (*Circus macrurus*), Morogoro, 28. ii. 18, and in a Kestrel (*Cerchneis tinnunculus*), Morogoro, 4. xii. 17. In both instances there were also lizards of other families in the stomach.

Holaspis guentheri (Gray) ?

Blgr. Cat. Liz. iii. 1887, p. 118.

During an action at Matombo, 3. ix. 16, I saw what I believe to be this lizard coming down the trunk of a large tree. It was a handsome creature with a blue tail and good deal of blue about the back. On breaking camp two days later I again passed this tree, and left the road to inspect. As I rode up I caught sight of the lizard running up the trunk. As no specimen was collected I cannot be sure of the species, however.

Gerrhosauridæ.

Gerrhosaurus major (A. Dum.).

Blgr. Cat. Liz. iii. 1887, p. 121.

Seven specimens in all were collected ; their variations can best be shown in the following table :—

Index letter.	Sex.	Locality.	Measurements : H. & B., Tail.	Colour.	Scale characters.
(*a*) ...	M.	Lumbo.	240–315	Fulvous brown.	Fronto-nasal *not* in contact with rostral
(*b*) ...	F.	„	240–235	„	„ in contact with rostral.
(*c*) ...	M.	Morogoro.	175–250	„	„ „
(*d*) ...	M.	„	200–267	Dark brown, spotted yellow.	„ *not* in contact with rostral.
(*e*) ...	F.	„	200–260	„	„ „ „
(*f*)...	F.	„	142–172	„	„ „ „
(*g*) ...	F.	Dodoma.	210–217	„	„ „ „

It will thus be seen that all the specimens with the exception of "*b*" and "*c*" disagree with one of the specific characters of *G. major* in that the fronto-nasal scale is not in contact with the rostral. The Lumbo specimens were taken at almost the same

spot, and are obviously the same species. All the specimens agree in having 10 longitudinal ventral scale-rows, 17–19 longitudinal dorsal scale-rows, and 34 transverse dorsal scale-rows.

The colour and scale-character key given by Schmidt* breaks down for the specimens (*d*) to (*g*), which, according to the key, would fall under *Gerrhosaurus grandis* (Blgr.) of Zululand.

Both the Lumbo specimens were taken from holes in termite heaps; in one instance two mungoose (*Herpestes ivori*) were occupying the same burrow, all three creatures being found huddled together at the end of the hole. Nearly all the Morogoro specimens were taken among the rocks bordering the river at the south side of the town. The Dodoma specimen was taken on a rocky kopje in desert country.

The examination of the stomach of one of the Lumbo specimens revealed small beans and grass with a single leg from a beetle. As already mentioned, one captive specimen seized and ate a lizard (*Eremias spekii*). From one of the Lumbo specimens five tapeworms were removed, each about a foot long.

Gerrhosaurus nigrolineatus (Hallow).

Blgr. Cat. Liz. iii. 1887, p. 122.

Specimens possibly belonging to this species, and certainly referable to it according to the key and descriptions in the 'Catalogue of Lizards,' have been placed under *G. flavigularis* (Gray) for reasons stated below.

Gerrhosaurus flavigularis (Gray).

Blgr. Cat. Liz. iii. 1887, p. 122.

A large series of *Gerrhosaurus* of this group were collected at Nairobi, Moschi, Morogoro, Mkuyuni, Dar-es-Salaam, and Lumbo. Also seen at Gonya, Handeni, and Kerogwe.

In his admirable paper on the "Herpetology of the Belgian Congo," Schmidt† suggests that all South and East African species of this group should be known as *flavigularis flavigularis*; whilst he proposes to retain the name of *nigrolineatus* for the West African forms which have a preponderance of *nigrolineatus* characters, these to be known as *flavigularis nigrolineatus*. The key which he applies for the distinguishing of the two races is as follows:—

CC. Tympanic shield narrow; a dorso-lateral stripe; dorsals in 54–64 transverse rows ..... *flavigularis*.
D. Dorsal scales in a transverse row 20–26, mode 22 (South and East Africa) ..... subsp. *flavigularis*.
DD. Dorsal scales 24–28, mode 26 (Angola, Lower Congo). subsp. *nigrolineatus*.

In our series of thirty-nine specimens only three have 24 scale-

* Schmidt, Bull. Am. Mus. Nat. Hist. xxxix. 1919, p. 519.
† *L. c.*

rows, twenty-six specimens have 22 scale-rows, and ten have 20 scale-rows.

This character of *flavigularis* seems, therefore, a good one by which to differentiate East African forms. In twenty-nine specimens examined by Nieden he found only three specimens with more than 24 dorsal scale-rows.

If we apply the relative position of the head-scales to the present series thus,

Præfrontals in contact forming a long suture ..... *nigrolineatus*,
Præfrontals separated, fronto-nasal touching frontal ..... *flavigularis*,

we find no less than twenty-nine of the specimens would be referable to *nigrolineatus*, only five to *flavigularis*, whilst five are intermediate in that the præfrontals are only barely in contact. As has just been pointed out in the case of *Gerrhosaurus major*, the relative position of these head-scales as a specific character is of but little use in this genus.

If the character of the number of femoral pores be applied,

Femoral pores 14 or more ..... *nigrolineatus*,
Femoral pores 13 or less ..... *flavigularis*,

we shall again find that the large majority of the lizards are referable to *nigrolineatus*. Not having had the opportunity of going into the matter more thoroughly or examining Central and West African series of these lizards, I do not like to express an opinion, but where both *nigrolineatus* and *flavigularis* are found overlapping in so many localities it seems a pity not to unite them as a single species.

The largest male taken measured $18\frac{3}{8}$ inches (156·311 mm.), the largest female $17\frac{3}{8}$ inches (137·305 mm.).

The coloration of the young specimens was generally more vivid than in the adults. The following colour notes were made on capturing a young speciman at Lumbo:— "Centre of back occupied by broad chocolate-brown band, bordered on either side by a black line one scale in width, on the outer side of which again is a sea-green or yellowish line. Both lines disappear about half-way along tail. Sides vertically streaked with black and sea-green, usually two of the former to one of the latter. Belly white with creamy tinge. Fore-legs brown, mottled black and sea-green, hind-limbs spotted with pale yellow. Tail brown, with indistinct markings except on the basal portion where the markings of the back persist." Adult males show a great deal of red or pink laterally on body and tail; this disappears usually in preserved specimens.

At Morogoro (4. i. 17) a female was taken with four white eggs in ovary; these measured $\frac{7}{8}$ inch long. A young male $8\frac{1}{4}$ inches in length was taken at the same place (19. 1. 17). Of this specimen a note was made:—"No gaudy markings; the yellow lines are pale almost to whiteness and the black marks are unnoticeable except by close examination."

Grasshoppers were the chief article of diet; there was the one interesting attempt to take a lizard (*Eremias spekii*) out of the mouth of its larger relative (*G. major*) already noted.

At Morogoro (7. i. 17) an 18-inch specimen was eaten by a Sand-Snake (*Psammophis sibilans*). At the same place (28. ii. 18) a young one was taken from the stomach of a Harrier (*Circus macrurus*). At Dar-es-Salaam (24. vi. 18) a Kingfisher (*Halcyon orientalis*) was shot, in whose stomach was found a *Gerrhosaurus* measuring 91 mm. in length.

Scincidæ.

Mabuia maculilabris (Gray).

Blgr. Cat. Liz. iii. 1887, p. 164.

Only four specimens of this lizard were taken. One from Mombasa, two from Morogoro, and one from Duthumi; the latter measured $9\frac{7}{8}$ inches (73·178 mm.), whilst the larger Morogoro specimen measured $9\frac{1}{2}$ inches (89·152 mm.).

Mabuia brevicollis (Wiegm.).

Blgr. Cat. Liz. iii. 1887, p. 169.

Six specimens taken at Kagiado (28. xii. 15) and Longido West (ii. 16). Of these, the Longido specimens were all young ones, which I caught one by one as they emerged from their refuge in a termite heap. They measured 44 plus 41 mm., 43 plus 43 mm., 43 plus 40 mm., 43 plus tail (injured). In these young specimens the markings are very distinct and the side stripes are continued across the back, uniting with their fellows on the opposite flank. In a half-grown specimen from Kagiado measuring 65 plus 71 mm. there is an interruption by an unmarked scale-row along the dorsal median line. In the adult from the same locality the markings have receded to the flanks, where they are just distinguishable. This specimen measures $8\frac{3}{8}$ inches (130·83 mm., tip missing), and is an almost uniform dark brown. Both the Kagiado specimens were taken on the same termite heap from whose openings they emerged. The adult is infested with acarines on the ventral scales.

Mabuia megalura (Ptrs.).

Blgr. Cat. Liz. iii. 1887, p. 195.

A large number were collected at Nairobi, one at Longido West, and sixteen at Lumbo. Of the latter, the largest male measured 8 inches (55·145 mm.) and the largest female just over $11\frac{3}{4}$ inches (65·235 mm.). Colour during life as follows:—"Above pale bronze. A pair of black zig-zagging lines (caused by borders of scales being black-edged) commence in scapular region and end in pelvic region, though faintly persisting on upper surface of tail in the form of a double row of black specks. Upper labials white; the white persists in the shape of a narrow

band along the side: this band is only one scale wide and vanishes on the tail. Throat and under surfaces white." One Nairobi ♀ specimen has longitudinal striations on whole of under surface.

A female taken on September 20th, 1918, at Lumbo held four eggs 8 × 6 mm. Another female taken at Parklands, Nairobi, on 22. vii. 15 had four eggs 8 or 9 by 6, irregular in shape and containing small embryos.

It seems to me that the Lumbo specimens have much longer tails than the B.E.A. and G.E.A. specimens. The habit of the latter is much stouter both in body and thickness of tail. Their colour is much darker also. Unfortunately the series from Nairobi is not available, with the exception of twelve specimens; the largest of these measures 80 mm. in head and body and 122 mm. in tail, which is intact. Another ♀ 55+165 mm., ♂ 55 +163, ♀ 55+162.

The Lumbo specimens were found rushing about on sandy ground, which is very sparsely grown with clumps of grass. Nairobi specimens on the other hand were collected in grass up to one's knees, either on the plains or near the Parklands Forest edge. They clambered with great agility about the tops of the grasses. Possibly the different kind of country where they were obtained explains the differences in appearances and the relatively shorter tail length of the grassy upland forms.

Spiders, a little grass (probably accidentally introduced), and parasitic worms were found in the stomach of a male at Lumbo. The worms have been identified as immature Physaloptera.

Mabuia quinquetæniata (Licht.).

Blgr. Cat. Liz. iii. 1887, p. 198.

Two males only obtained at Dodoma, 8. xii. 18. The larger measured $8\frac{3}{4}$ inches (92·128 mm.) and the smaller just under $8\frac{1}{2}$ inches (90·113 mm.). Colour during life:—"Pale bluish, with faint coppery traces of lines on the back. Neck striated with bright yellow and blackish lines. Preserved specimens do not show these so well." Both specimens were living beneath boulders on rocky kopjes.

Mabuia varia (Peters).

Blgr. Cat. Liz. iii. 1887, p. 202.

Twenty-seven specimens collected at Nairobi, Longido West, Kongwa, Morogoro, Duthumi, Lumbo, and Delagoa Bay. Was also seen at Mbunyi and Kahe. The largest specimens came from Nairobi, though Lumbo specimens had longer tails than either B.E.A. or G.E.A. specimens.

Largest	Nairobi.	Male	$6\frac{1}{8}$	inches	(65·90 mm.).
,,	,,	Female	$6\frac{3}{8}$	,,	(68·95 mm.).
,,	Lumbo.	Male	$6\frac{1}{4}$	,,	(55·102 mm.).
,,	,,	Female	$6\frac{5}{8}$	,,	(63·103 mm.).

A constant feature in the coloration of the Lumbo specimens was the black specklings on the lower labials and chin region which was only found, and then but slightly, in two specimens (Morogoro) from other localities. The two specimens referred to were taken on the Uluguru Mts., 3000 ft. above Morogoro; they differed from the specimens collected elsewhere in the very dark ventral surface which is usually white.

The colouring of Lumbo specimens noted at the time was as follows:—"Above of a pale or dark bronze, back variegated with black spots, sometimes tipped with white. In one male three somewhat indefinite white dorsal lines. White stripe commences at nostril, unites with white upper labials at end of mouth, passes beneath eye and through ear, and continues along side, where it is particularly clear and distinct, as far as hind-leg, where it ends. Distinct reddish tint in lumbar region and base of tail. The whole under surface of body and tail pure white. Throat white, freckled at chin and lower jaw region with jet black spots."

The following notes were made on present females:—

21. iv. 17.	Kongwa.	7 eggs containing minute embryos, eggs 8×6 mm.
17. vi. 15.	Nairobi.	4 eggs containing large embryos, eggs 12×8 mm. Embryos $15 + 10$ mm.
11. vii. 18.	Lumbo.	5 eggs measuring 9×6 mm.
,,	,,	5 ,, ,, $10 \times ?$ mm.
,,	,,	7 ,, ,, 10×10 mm. contained large embryos.

Mabuia striata (Peters).

Blgr. Cat. Liz. iii. 1887, p. 202.

Twenty-six specimens were collected at Nairobi, Morogoro, Duthumi, Dar-es Salaam, and Lumbo. This lizard was seen at almost every place through which we passed, as it is so common and unmistakable a large series was not collected. It adapts itself to any situation, arboreal or terrestrial. I have seen a pregnant female basking on a palm leaf; the Dar-es-Salaam specimen was obtained running down a palm-tree trunk. The grass-huts of natives are a favourite spot, but it adapts itself to the stone-built dwelling of the white man, emerging from holes in the masonry to bask on window-sills or on the galvanised-iron roof. In one house in which the writer lived they used to make a great racket in the roof-guttering, where they could chase each other. On putting on my slippers on one occasion, I found one in the toe, where it had evidently retired for the night, as it was evening. Rockeries and rubbish-tips afford good refuges, and they fall easy victims when found inside old tins in the latter situation, which is often the case.

The largest male, $8\frac{3}{4}$ inches (97·125 mm.), was taken at Lumbo, also the largest female, $9\frac{3}{8}$ inches (108·130 mm.). The colour varies a good deal. At Handeni I observed some large specimens basking

on the ruins of a hut; they were unusually spotted between the dorsal lines. I marked one down and caught it beneath a beam: to my surprise it had no spots. It was just possible the specimen I was originally pursuing had got away and I had captured another; on the other hand, the blotches may be a sign of health and vigour, and disappear when the lizard is frightened. A female was taken at Morogoro with a salmon-coloured throat; it was also much spotted dorsally. At Nairobi (13. vii. 19), the weather being very cold, two Skinks were seen upon the wall, the one having chased the other up; both fell off the wall and, being sluggish, were easily captured. One was a male (85·109 mm.) and had the throat mottled brown; the other, whose sex was not determined, had the throat mottled orange.

The following notes were made on pregnant females:—

28. viii. 15.	Nairobi.	Ovules small.
26. x. 19.	„	7 large young, about $2\frac{1}{2}$ inches in length.
24. xii. 14.	Delagoa Bay.	4 young, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches, and 1 bad egg.
16. xii. 16.	Morogoro.	Ovules small.

At Morogoro (23. xii. 16) a striped Skink was seen running along with a nauseous gaudy grasshopper in its mouth. Sitting *after* sunset one day (27. i. 17.) by the river-bank, a Skink came out of a hole just beside me, and snapped the head off a millipede which was also out for an evening stroll. Grasshoppers, a beetle, and a land-snail's shell were found in the stomach of a Nairobi specimen (5. ix. 19).

On three occasions specimens of this Skink were found in the stomach of hawks at Morogoro:—(i.) Kestrel (*Cerchneis tinnunculus*), 4. i. 18; (ii.) Harrier (*Buter b. rufiventris*), 31. i. 18; (iii.) *Circus macrurus*, 28. ii. 18.

Some cats are very fond of harassing these Skinks. At Nairobi (5. ix. 19) a cat brought one into the house; twice she released and recaught it, yet the lizard did not drop its tail. I held the cat up by the tail until she released the Skink, and, though she had chewed it, when dropped, it ran away and escaped into the garden. Somehow she managed to again find it, and brought it into the house in a dying state, its tail still intact.

Nematode worms (*Oochoristica* sp.) were found in the stomach of the Dar-es-Salaam specimen in large numbers.

Lygosoma sundevallii (Smith).

Very large numbers of this snake-like Skink were collected. For the present paper fifteen specimens from Nairobi, Ngari Mtoni, Moschi, and Morogoro were available, and a series of over fifty specimens collected at Lumbo during July 1918.

A manure-heap is one of the best collecting-grounds for this

Skink; some of the finest specimens were found among the stones of a camp incinerator which was being demolished; beneath stones, especially where there is an ant or termite nest, and in accumulations of garden rubbish are other spots favoured by the species.

The tail of this Skink is so often reproduced that it is difficult to obtain full-grown specimens with the original tail. Some record lengths were, however, obtained :—

Largest	Morogoro.	Male	?	(140·? mm.).	Tail reproduced.
,,	,,	Female	?	(132·? mm.).	,, ,,
,,	,,	,,	8 inches	(105·100 mm.).	Tail intact.
,,	Lumbo.	Male	7 ,,	(97·80 mm.).	,, probably reproduced.
,,	,,	,,	7¼ ,,	(95·90 mm.).	,, intact.
,,	,,	Female	7½ ,,	(106·84 mm.).	,, probably reproduced.

Average of 50 Lumbo specimens $5\frac{5}{8}$ inches (80·61 mm.). Tails intact and reproduced. The 50 Lumbo specimens consisted of 23 males and 27 females, so that the proportion of the sexes is fairly equal; all were collected in an area under 300 square yards.

The variability of the coloration of this species almost baffles description. The tendency in Morogoro specimens was to be heavily spotted with black on a ground-colour of purplish brown, a very handsome form. The Lumbo specimens inhabiting a sandy soil were more often of a light brown colour. Notes made at the time read : " Very variable. Usually plumbeous above and dirty white below. Underside of tail as often mottled as not. Some specimens mottled all over upper surface with black and white; black spots oblong, white spots round or oval. Others again are plain above, but mottled on the sides and tail." The uniform dirty white of the under surface is noticeable in these Lumbo specimens when compared with those obtained at Morogoro, which are generally mottled on the under surface of head and body as well as tail.

Three females were found with developing eggs:—(i.) 2 eggs 7×6 mm; (ii.) 4 eggs 12×8 mm.; (iii.) 4 eggs 15×8 mm. All Lumbo (three very young specimens taken) :—(i.) Morogoro, 1.ii.18, 76 mm.; (ii.) Lumbo, vii.18, 85 mm.; (iii.) Morogoro, 1.ii.17, 91 mm.

Freshly emerged bluebottles were more often found in their stomachs than any other food; specimens from the incinerator afore-mentioned were particularly well fed on these. Bluebottle pupæ were also found. Pupæ and ordinary flies (Muscidæ), beetle, lizard's tail, lizard's scales. The two specimens found with lizard remains in their stomach had probably been feeding on *Ablepharus wahlbergi*, which was abundant in the same patch of ground.

Natives always kill these inoffensive creatures, supposing from their snake-like aspect that they are poisonous.

Lygosoma ferrandii (Blgr.).

Blgr. Ann. Mus. Gen. (2) xviii. 1898, p. 718.

Seven specimens in all; six of these from Longido West have been examined by Mr. Boulenger and referred to this species. The measurements are as follows, though almost all the specimens have reproduced tails:—

Dodoma.	Female	91·36 mm.	Longido.	Male	56·46 mm.
Longido.	Male	90·40 mm.	,,	,,	53·50 mm.
,,	,,	62·62 mm.	,,	,,	43·37 mm.
,,	,,	59·59 mm.			

The 118 mm. specimen was caught under rather unusual conditions. After a night of heavy rain I was summoned at 6 A.M. to the tent of one of the sergeants to see a small snake (*Lycophidium jacksoni*) labouring to swallow this Skink. It was the only snake of this species captured. Another man told me that he had killed a snake with tiny legs in his blankets; on the battered remains being produced it proved to be this species. The other specimens were all obtained under stones. These Longido specimens are of a uniform nut-brown colour above, creamy or yellowish beneath.

Ablepharus boutoni var. peronii (Coct.).

Blgr. Cat. Liz. iii. 1887, p. 347.

Seventy-one specimens collected at Mombasa, Dar-es-Salaam, and Lumbo. This little lizard has adopted a marine life; it is a remarkable sight to see it running over the rocks, which a moment before were washed by waves; for company it has the peculiar fish *Periophthalmus* and crabs of many species. It flies before the incoming wave and presumably manages to avoid a wetting. It seeks refuge when pursued in the many crevices of the rock. It is extremely agile and difficult to capture.

Measurements of the largest specimens from each locality:—

Mombasa.	Male	3	inches	(42·35 mm.).	Tail regenerated.
,,	Female	$4\frac{1}{8}$	,,	(43·60 mm.).	
Dar-es-Salaam.	Male	$4\frac{1}{4}$	,,	(45·70 mm.).	
,,	Female	$4\frac{3}{8}$	,,	(47·65 mm.).	
Lumbo.	Male	$4\frac{5}{8}$	,,	(48·62 mm.).	Tail regenerated.
,,	Female	$3\frac{7}{8}$	,,	(50·46 mm.).	,, ,,

Coloration very variable. Some Lumbo specimens, both young and old, almost black, but underlying markings usually distinguishable on close examination. Greenish or olive-bronze; two light lateral (almost dorsal) stripes start at nostril. Upper surface of tail marked with white dots in lines; these were absent on regenerated tails. The Dar-es-Salaam specimens were much more brown or coppery, and with the markings more distinct than in the Lumbo specimens.

Five females collected at Dar-es-Salaam (11.iv.18) had each

two eggs in ovary; four of these batches were in an early stage of development and almost round, measuring 5 mm., 5 mm., 9 mm., and 11 mm. in diameter; in the fifth were developing embryos, which measured 11 × 6 mm., and were oval in shape.

Sea-slaters 10 mm. in length were found in the stomach of a 102-mm. specimen; sandhoppers 9 mm. in length in the stomach of a 107-mm. specimen. It seemed extraordinary that the lizards could swallow such large prey. Flies were found in the stomachs of a good many.

Tapeworm measuring 32 mm. in length was found along with the sea-slaters in the stomach of the 102-mm. specimen just referred to.

Ablepharus wahlbergii (Smith).

Blgr. Cat. Liz. iii. 1887, p. 350.

Eighty specimens were collected at Nairobi, Longido West, Morogoro, Mkuyuni, and Lumbo. The largest male was from the last locality, measuring 4 inches (40·59 mm.), though another specimen with renewed tail measured 2 mm. longer in the body. Largest female was from Mkuyuni and measured $4\frac{3}{32}$ inches (43·67 mm.).

The coloration of Lumbo specimens was as follows:—"Pale copper above, reddish tinge on tail. Dark copper band commencing at nostril, passes through eye, above fore-legs, and along side to hind-legs, where it disappears. A few irregular white lines in region of ear originating in white upper labials. Belly and underside of tail a transparent brick-red." This reddish appearance of tail was only seen in specimens collected after the middle of September: it may be a sign of the breeding-season or again of locality, for most of the specimens collected between July and September were collected at a different spot. The Nairobi and Morogoro specimens were much darker in colour, bronze rather than copper.

The species frequents grassy places, particularly where there is much garbage or fallen leaves. They apparently prefer moist spots beneath trees; large numbers were discovered in uprooting stumps and clearing the ground for making camps.

Two females collected in October 1918 at Lumbo had each two eggs measuring 6 × 2 mm. in ovaries. Two females collected at Mkuyuni (1.ix.16) and Morogoro (1.ii.18) had each six eggs measuring 7 × 4 mm. and 9 × 5 mm. respectively.

Principal food was white ants; a fly, beetle larva, and field cockroach were also taken from the stomachs of specimens.

A specimen caught at Handeni (27.vi.16, lost in transit) by the neck whirled its tail round very rapidly, and then making it suddenly rigid, caused it to break off; the tail exhibited considerable vitality, wriggling and jumping about for some time.

One of these lizards was found in the stomach of an Egret (*Bubulculus ibis*) at Morogoro (14.xii.17); as already mentioned,

scales and a tail fragment, probably belonging to this species, were taken from the stomachs of two Skinks (*Lygosoma sundevalli*). Three were found in the stomach of a snake (*Chlorophis neglectus*), Nairobi (17. vii. 18).

Scelotes eggeli (Tornier).

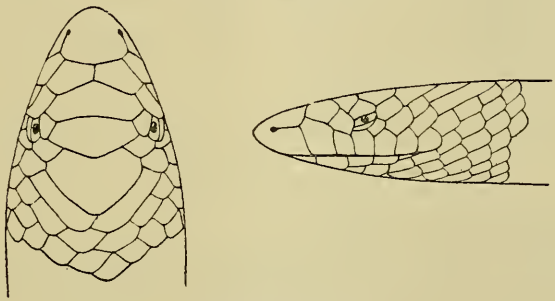
Torn. Zool. Anz. xxv. 1902, p. 700.

Eight specimens of this Skink which was described by Tornier from Usambara, G.E.A., were taken at Lumbo in July and August 1918. The coloration during life as noted at the time was as follows :—"Copper-coloured above, becoming plumbeous on tail; dirty bluish white below; the two separated by a very dark brown or blackish lateral band, well defined above but merging into the bluish white below. Throat sometimes spotted."

Largest male measured $3\frac{3}{4}$ inches (63·32 mm., tail short and regenerated), largest female $4\frac{1}{8}$ inches (67·38 mm., also regenerated). Smaller specimens with uninjured tails show that the tail should equal the length of head and body.

In ovaries of two females taken at Lumbo in July 1918 were each two eggs measuring 7×5 mm.

Text-figure 1.



Scolecoseps boulengeri.

Scolecoseps, gen. nov.

Among the lizards collected at Lumbo were seven specimens of a limbless burrowing Skink referable to no known genus.

Generic description. Characters as in *Melanoseps*, but nostril pierced in the very large rostral, with whose posterior border it is connected by a horizontal cleft, as in *Acontias*.

Locality. South East Africa.

Scolecoseps boulengeri, sp. n. (Text-fig. 1.)

Specific diagnosis. Snout conical, strongly projecting, length of the rostral a little more than one-fifth that of the head. Internasals in contact, sometimes very narrowly, separating rostral from fronto-nasal, which is twice as broad as long. Frontal equal to or but little larger than fronto-nasal. Interparietal

sub-cordiform, notch towards snout, larger than any other head-shields. Parietals narrow, band-like, narrowly in contact behind apex of interparietal. Two supra-oculars, no supra-ciliaries. Five or six upper labials, first largest, third entering the orbit. Eye distinguishable.

Mental very large, its posterior border corresponding with the suture between rostral and first upper labial.

Scales hexagonal, broader than long, in eighteen longitudinal rows at mid-body, in thirteen rows at base of tail. Anal divided. Tail less than half the length of head and body, ending in obtuse point.

Body flesh-coloured, with eighteen longitudinal brown striations corresponding with the scale-rows. Snout paler above and beneath, more or less free from mottlings. Tail darker by reason of convergence of thirteen striations, in some specimens almost blue-black. Reproduced tail-tips flesh-coloured or white and extraordinarily like snout.

Type locality. Site of British camp at Lumbo, which is situated on the mainland three miles from Mosambique Island, P.E.A.

Measurements of specimens collected :—

(*a*)	Male.	90·16 mm.	Type in British Museum.
(*b*)	Female.	65·25 mm.	Type in British Museum.
(*c*)	Male.	80·20 mm.	
(*d*)	Female.	95·41 mm.	4 eggs in ovary, 11. vii. 18.
(*e*)	,,	95·25 mm.	
(*f*)	,,	92·43 mm.	
(*g*)	,,	61·24 mm.	

Anelytropidæ.

Feylinia currori (Gray).

Blgr. Cat. Liz. iii. 1887, p. 431.

A single specimen of this aberrant Skink was found in a bottle in a German house at Morogoro. It measured 4 inches (92·10 mm.).

Chamæleontidæ.

Chamæleon gracilis (Hallow).

Blgr. Cat. Liz. iii. 1867, p. 448.

A single male from Longido West (22. ii. 16) measures $7\frac{3}{4}$ inches (100·96 mm.). Colour during life:—"Pale green, with dark green saddle-like markings bordered by black spots." Immediately after death "pale green became dark, dark green became pale, black spots turned orange." The creature was blind in one eye when found, having suffered some accident to the eye.

Chamæleon dilepis (Leach).

Blgr. Cat. Liz. iii. 1887, p. 450.

Collected at Voi (6. v. 16) and Mbunyi (10. v. 16) in B.E.A.,

at Gonya (29. v. 17) and Morogoro (1916-1918) in G.E.A., and Lumbo (1918) in P.E.A. Specimens which I believe to belong to this species were taken at Tsame, Handeni, and Msiha in G.E.A., but were lost in transit. Over 90 specimens were collected in all. Many of the Morogoro specimens might be referable to *Ch. dilepis isabellinus* (Günther), but as there is a good deal of intergradation, and sub-specificity of *isabellinus* is somewhat doubtful, I refer them all to *Ch. dilepis*.

The following are some of the measurements :—

Female.	Voi.	Snout to tail	$7\frac{3}{8}$ in. (142·115 mm.).
Female.	Mbunyi.	,,	$9\frac{1}{16}$,, (130·100 mm.).
Male.	Gonya.	,,	$6\frac{1}{16}$,, (90·80 mm.).
Male.	Morogoro.	,,	$13\frac{3}{8}$,, (largest of 23 specimens).
Male.	,,	,,	11 ,, (138·144 mm., average of 23 specimens).
Female.	,,	,,	$14\frac{1}{2}$,, (largest of 26 specimens).
Female.	,,	,,	$12\frac{1}{2}$,, (158·161 mm., average of 26 specimens).
Both sexes.	,,	,,	$11\frac{1}{5}$,, (148·153 mm., average of 50 specimens).
Female.	Lumbo.	,,	$11\frac{3}{8}$,, (145·140 mm., average of 13 specimens).

At Morogoro the sexes were very evenly balanced, but at Lumbo no males were taken at all; thirteen females were taken between July and October.

The number of eggs produced at a time is enormous. The Voi specimen (6. v. 16) contained 44; the Mbunyi female (10. v. 16) 28; at Morogoro between end of February and early in March the largest number of eggs found were 48, 44, 43, and 40 respectively. These eggs when nearly ready for laying are almost spherical, and measure from 9–10 mm. in diameter. On January 1st, 1917, after very heavy rains, the sun shone out brightly. I took two very young chameleons on shrubby growths not more than a foot from the ground and quite half-a-mile away from each other. These young have a ridiculous appearance, the head being out of all proportion to the body; the occipital lobes are scarcely developed; their coloration was much brighter than in the adult. Both measured less than 3 inches; other very young ones were taken in February and March. Oviposition takes place between March and June apparently, which coincides with the rains; no enlarged ovules were found after April at Morogoro, or in the thirteen Lumbo females which were collected between July and October.

The chief diet of the species is grasshoppers; I have also seen a captive specimen take a large black field-cricket. The following have been found in their stomachs :—Cockroaches, a praying

mantis, flies, bluebottles, rose-beetles, a fairly large scarab, remains of many species of smaller beetles, and a millipede. Other finds which can scarcely be classed as articles of diet include portions of the chameleon's own cast skin, half a nutshell which was probably too bulky to pass out, and in a specimen which was found dying there were four fragments of mica—three pieces measured 8×9 mm. and one 8×11 mm.; doubtless all had split off from one piece which had adhered to the chameleon's tongue when it was feeding. During a shortage of insects I fed strips of Bulbul flesh to a chameleon; it took them readily enough, but afterwards disgorged them again.

I rarely found these chameleons on bushes, but usually met with them crossing the road; several of them were taken ascending the trunks of trees. Their movements are sedate, and each step appears to be well meditated before being taken. They sway gently from side to side when walking. When molested or picked up, it assumes the policy of frightfulness: the occipital lobes are raised, the mouth gapes widely to show the red interior, the throat is dilated so that the orange-coloured interstitial skin is seen between the black scale-rows, and a startlingly sudden lunge forward is made—sometimes an actual bite if the creature is sufficiently enraged. The teeth are blunt and conical, and only once on the many occasions on which I have been bitten have I known this species to draw blood.

The native has a holy horror of them, and even boys who will capture and handle the most venomous snakes, cannot bring themselves to touch an uncanny chameleon. "It spits at you," they say, "and cannot you see it has a bad eye?" This superstition is shared by the uneducated Dutchman. I recollect on one occasion, when the column halted for ten minutes one day, I picked up a chameleon, which truly horrified a young Dutchman beside me: he implored me to put it down. His argument was: "They are poisonous, because if you put some pipe-oil in their mouths they will die. You can always tell a poisonous snake by this test, for the harmless species are not affected by the oil." He told me he knew of a woman who died from a chameleon bite. I put my little finger into the chameleon's mouth, and let it chew vigorously for a few seconds so that its teeth marks could be plainly seen. He said it was evidently a young one, and was not the least disturbed in his beliefs.

Their only enemies at Morogoro as far as I know were the Boomslangs (*Dispholidus typus*). On four occasions I found or heard of these snakes falling out of trees with a chameleon: the chameleon is evidently an awkward mouthful. I fed chameleons to captive Boomslangs and the snakes took them, but not before there was a contest between them; the chameleons went through the frightfulness tactics already mentioned, which caused the snakes to start back. A large brown Boomslang was shot at Lumbo with a chameleon in its stomach.

No parasites were found in the stomachs of any of the specimens examined.

Chamæleon dilepis isabellinus (Günth.) ?

Günther, P. Z. S. 1892, p. 556.

As already stated, many of the Morogoro specimens might be referred to this subspecies; so it is with considerable hesitation I apply this name to a female from Gulwe (28. iv. 17) measuring 101·101 mm. and a female from Dodoma (8. xii. 18) measuring 105·106 mm., which, while typically *isabellinus*, I believe might find their counterpart in the long series of seventy specimens collected at Morogoro.

Chamæleon bitæniatus (Fisch.).

Blgr. Cat. Liz. iii. 1887, p. 452.

Eight specimens were collected at Longido West (ii. 16) and on the Longido-Moschi trek. Colour in life:—"Light brown or khaki; a light lateral stripe commencing at the eye disappears towards the base of the tail; a lower stripe commencing on the upper labials continues along the side to the hind-leg; two small saddle-like markings on anterior part of back were of an ochre tint, and there were three blotches of the same colour connecting the upper and lower stripes."

Six of the eight specimens were females, the largest measuring $6\frac{1}{2}$ inches (88·78 mm.), largest male $5\frac{5}{8}$ inches (75·68 mm.). Four of the females contained eggs, from seven to ten in number. The largest were 7 mm. in diameter. Probably they would be laid in March.

Chamæleon hœhnelii (Steind.).

Steind. Sitz. Ak. Wien, 1891, p. 307.

There are several examples in the Nairobi Museum of this chameleon which were collected by the writer at Kabete (20. ii. 15) and West Kenia (23. xi. 15). The largest male from the last-named locality measures $8\frac{1}{2}$ inches (110·100 mm.) and the largest female $5\frac{3}{8}$ inches (73·63 mm.). The size of the casque in these specimens varies a good deal.

Chamæleon jacksoni vaueresceæ (Tornier).

Torn. Zool. Jahrb. Syst. xix. 1903, p. 176.

This is the common Three-horned Chameleon of Nairobi; it differs from *Ch. jacksoni* (Blgr.) in that the females are three-horned like the males. A very large series was collected at Nairobi in 1915 and 1919. Unfortunately these are not available for the present paper as they are in Nairobi, except four specimens and some notes made on a few of the others.

Meek, in his paper on the "Batrachians and Reptiles from British East Africa," makes reference to this subspecies under the name of *Chamæleon jacksoni* (Blgr.). He refers fifteen specimens collected in Lukenya Province to this species, yet says: "The males are easily distinguished by having the rostral and two occipital horns of about equal length. These cephalic projections on the female are short; the occipital ones are usually very short, in these specimens never more than half the length of the rostral horn." This is then followed by a table of measurements in support of the theory. By occipital he means præ-orbital horns.

There is nothing to support this in the series collected at Nairobi, of which measurements were taken. Only the measurements of eleven specimens are given below, as there is no doubt about the sex of these specimens; measurements were taken of twice this number, but not being available for sexing, they are not taken into account:—

Register Number.	379.	6129.	3534.	238.	6131.	6130.	232.	333.	3809.	3253.	4563.
Sex	M.	M.	M.	M.	M.	F.	F.	F.	F.	F.	F.
Length of head and body	113	100	91	90	65	132	118	117	116	100	75
Length of rostral horn	17	17	17	17	7	15	19	19	22	12	5
Length of præ-orbital horn ...	18-17	18	18-17	17	7	6	19	19	25	5-6	1·5

Where two lengths are given for the præ-orbital horns it is because they are of unequal length, and the measurement of the right horn is then given first. It will be seen that the greatest variation is found in the respective horn lengths. In two of the females the rostral and præ-orbital horns are of the same length, as is the case in most males; in one specimen (3809) the præ-orbital horns are much longer than the rostral, whilst in another (4563) the præ-orbitals are like tiny thorns only 1·5 mm. long.

One sometimes finds specimens with injured horns apparently in process of being regenerated. Natives are, I believe, often responsible for this condition of affairs. They are very afraid of these reptiles, and so, if a young man has courage enough to seize one of the creatures and cut off its horns with a knife, it is counted greatly to his credit. I believe this is done so that the horns may be presented to his lady-love to thread on her necklace as proof of his devotion.

The largest specimen taken was a female 14¼ inches long (132·128 mm.). This specimen had also the largest number of eggs, no fewer than forty being found in the ovary; these measured 20 × 20 mm. (17.vii.19). Thirty-six were found in another

specimen, whilst the lowest number found was eleven measuring 4 × 4 mm. (10. v. 15).

Most specimens were found during the early rains of March–April 1915, when the following notes were made of the use of the horns in fighting, etc.:—

March 31st, 1915; Nairobi.—I have half-a-dozen live chameleons on branches of Eucalyptus, which are tied to the cords of the electric lights and about five feet from the ground.

Whilst sitting at the table writing, I heard the sound of a moth flapping its wings, and, glancing round, saw a large yellow underwing (*Mœnas fullonica* ?), twice as large as the common English Yellow Underwing, in one of the Eucalyptus branches. Supposing it to have got caught in a spider's web, I seized a killing-bottle; on reaching the spot, however, I found that it was caught by the right-hind wing by one of the chameleons. Being large and strong it flapped vigorously: the chameleon, biding its time, gulped it down in the intervals between its struggles until only a small portion of the body of the moth remained to view.

Meanwhile, the second chameleon on that branch had been eyeing its companion with evil intent. As soon as it perceived that the captor was in difficulties, it hurried across the intervening twigs, and pausing only to take aim, shot out its tongue and caught one of the now feebly flapping wings; having got this into its mouth, it commenced a tug-of-war jowl to jowl, and thus succeeded in wrenching the whole moth from its companion's jaws. The poor moth's "fur" was flying in the air, and the first chameleon's mouth was woolly with it—this was all the share of the spoils that it was destined to receive.

There are three electric-light cords with branches tied to them, and on each are two of these chameleons. More than two are not tolerated; introduce a third, and the two original inhabitants hurry towards it open-mouthed, striding along faster than on any other occasion. As a preliminary to fighting, the opponents face one another, swaying their bodies from side to side; and if the intruder does not turn tail at this and cast himself to the ground, as is generally the case, he is at once attacked. One of the chameleons was very ingenious, placing his chin to the branch, which was of course vertical, so that his rostral and præ-orbital horns point directly downwards; he thus advanced upon the foe as it were with fixed bayonets: by this means he generally succeeded in sweeping his opponent off, but sometimes the latter would seize one of the horns with its fore-foot, and a tussle would begin.

They would bite each other hard, and in one instance the one chameleon mounted the other's back, and digging its claws in continued the attack from this vantage point. So strong was its grip that I had the greatest difficulty in separating the combatants. Several times have I seen one seize the other's "arm" in very human fashion, and then butt in with its armoured head.

This use of the horns interested me greatly, as I had hitherto regarded the horns as an extravagant growth such as is common in beetles.

One chameleon in throwing itself off the branch was injured, and lay on its side; the hind-limbs and tail were paralysed. When put on the branch, it dragged them after it very helplessly. In one minute from the time of its fall the tail and hind-limbs and posterior part of the body were almost white, the rest of the body being dark green verging on black. As it did not recover I chloroformed it three minutes later.

April 1st, 1915.—Another of the chameleons fell or threw itself down and was killed; the posterior half of the body went white immmediately, and the creature never stirred again. Sometimes one will jump down six or more times in a single morning, and so I conclude that these two accidents occurred through the chameleons falling on their backs. When given a grasshopper one of the chameleons held the kicking fore-legs in its "hands"; another, which was given five ant-lions in succession, made use of its "hands" in very human fashion for pulling off the gauzy wings which were flapping about its jaws.

Chamæleon melleri (Gray).

Blgr. Cat. Liz. iii. 1887, p. 472.

Two specimens of this giant chameleon were taken. A female at Mkuyuni (31. viii. 17) measured 21 inches (273·261 mm.), and a male at Morogoro (1. x. 18), tail mutilated, 238 mm. Extruded tongue measured 17 inches.

My attention was drawn to the female by the horse-guard, who found it wandering in the grass; its colour then was yellow and green, pale and dark shades of both. Placed under a pot it became dark green, and then almost black with wrath. Suspended by the tail it would turn, and grasping its hind-legs with its fore-legs, climb up its own tail. Its claws were sharp enough to make my bare arm bleed as it crawled up to my shoulder.

The second specimen was brought by a boy who caught it in the hills behind Morogoro; it lived well enough in a large cage until a Lemur was introduced into the same cage, which already contained a 12-ft. Python. During the night the Lemur chewed the chameleon's tail to a rag; the second night I caught it doing the same thing, so chloroformed the chameleon. I was surprised that a creature like a Lemur could tackle so big a chameleon whose bite must be pretty severe.

Rhampholeon brevicaudatus (Mats.).

Matschie, Sig. B. Ges. Naturf. 1892, p. 107.

A female was taken at Morogoro (28. xi. 17) measuring 2¼ inches (40·16 mm.) over all. It contained five eggs of oblong

shape measuring 9 × 5 mm. In captivity it took bluebottles readily.

Rhampholeon kerstenii (Peters).

Blgr. Cat. Liz. iii. 1887, p. 175.

Two females, the largest, Voi (19. vi. 16), measuring $3\frac{1}{2}$ inches (62·28 mm.). The other, collected at Gonya (29. v. 16), measures just over 3 inches (51·26 mm.). A third specimen, probably of this species, was caught crossing the road at Handeni, but lost in transit.

The Gonya specimen was caught holding on to the edge of a fragment of bark with its right side pressed to the bole of a stump. Every peculiar angle of its head and body seemed to assist in the deception—the colouring was perfect. Two yards away a second specimen was found crawling out of the stream, into which it had evidently been tumbled by natives engaged in clearing bush and undergrowth. It subsequently escaped.